was unchanged. Both reagents when applied to cotton fibers quickly destroyed them.

Figs. 1 and 2, Plate I, represent transverse sections, and fig. 3 a longitudinal radial section of this tissue, taken near *c*, fig. 4. The transition between the wood cells centrad of the cork and the cork cells is remarkably abrupt (fig 1). On the peripheral side of the cork there is no such abruptness, the cork cells, *c*, *c*, *c*, fig. 2, shading imperceptibly into the wood cells, *x*, *x*.

In all the sections the cork cells are seen to be quite irregular, much more than this tissue normally is. Some sections from other parts of the stem showed a more regular tissue; in several instances radial series of rectangular cells were observed, though fig. 1 is about the average as to regularity.

The wood cells last formed in autumn are quite different from the earlier ones. In fig. 1 the last .12^{mm} of wood cells (from *a* to *b*) are thicker walled and have less angular cavities than the older portion. In fig. 3 the difference is still more marked, the wood from *a* to *b* consisting of greatly elongated fibers with irregularly thickened walls; whereas the majority of the wood consists of shorter, smooth-walled fibers with oblique ends (*x*, fig. 3).

I am unable to present any satisfactory explanation of the formation of cork in the positions described. Numerous theories have suggested themselves, but all are open to too grave objections to be worth presenting.

EXPLANATION OF PLATE.—Figs. 1 and 2. Transverse sections of a portion of the stem of *Catalpa speciosa*, Warder.

Fig. 3. Longitudinal radial section of the same.

The reference letters are the same in all the figures.

c, cork cells; *C*, central side of the section; *m*, cell of medullary ray, with pitted walls; *p*, large pitted vessel; *P*, peripheral side of the section; *x*, smooth walled wood fibers; x^1, younger wood fibers with irregularly thickened walls.

All the figures were drawn with a camera, under Beck's $\frac{1}{4}$ objective and A eyepiece.

GENERAL NOTES.

A New Aristida.—ARISTIDA BASIRAMEA, Engelmann in a letter to W. Upham.—Annual: culms erect, 6 to 15 inches high, slender, much branched at the base (some of the branches very short but floriferous), and with short floriferous branches enclosed in the upper leaf sheaths: leaves comparatively long (3 to 6 inches), narrowly linear, flat, becoming involute toward the apex, sparsely hairy on the margins below, the upper ones nearly equaling the panicle; sheaths striate, loose; ligule very short, truncate: panicle $1\frac{1}{2}$ to 3 inches long erect, rather lax, its base sheathed by the upper leaf; branches of the panicle

short, mostly single, the lower in twos or threes: glumes linear, unequal, 1-nerved, lower one 4 lines, upper one 6 lines long including the short bristle-like point; flowering glume nearly terete, spotted with black, about 5 lines long including the short, acute and hairy callus; middle awn about 6 lines long, the lateral ones about 4 lines long, spirally twisted below (when mature). The sheathed flowers are somewhat smaller.

This species was discovered last season by Mr. Warren Upham, at Minneapolis, Minn. The late Dr. Engelmann suggested the name, in a letter, as indicative of its habit, and would have published it if he had lived. It is closely related to *A. dichotoma*, from which it differs in its shorter, erect (not dichotomous) culms, and in its much larger flowers, and especially in the much longer, spreading, lateral awns. From *A. gracilis* it differs in the shorter panicle, the longer upper leaves with sheathed flowers, and in the flowers being twice as large. From *A. ramosissima* it differs in wanting the larger size, the diffusely branched habit, the much larger flowers with 3 to 5-nerved glumes, and the strong recurved middle awn of that species. It is probably widely diffused in the prairie region of the Northwest, Mr. Upham having received it from St. Cloud and other places in Minnesota, with reports of it from Iowa and Manitoba. It appears also to be the same as specimens collected in Kansas by Mr. E. Hall and distributed as *A. gracilis*.—GEO. VASEY.

Fungi Hungarici.—The third Century of this exsiccata has recently been issued by the publisher, Prof. George Linhart, Altenburg, Austro-Hungary The specimens are neatly mounted on heavy papers of the size of eight by ten inches; each Century being enclosed in a light box with an alphabetical index of the specimens on the cover. The habitats and notes on the labels are given, both in Hungarian and German, and to each is added the name of the collector and author by whom the specimen was determined. Several new specimens have appeared in each Century, accompanied by descriptions in Latin. Each Century is furnished with from 15 to 20 illustrations of the microscopic characters of specimens therein contained. Two Centuries are to be issued annually, and at the close of each five Centuries the author intends furnishing descriptions of the species, both in Hungarian and German. Among foreign exsiccata this work appears to merit the favorable recognition and encouragement of Mycologists. The original cost of 11 marks per Century is increased to American subscribers by expenses of transportation, etc., to nearly five dollars. Subscriptions may be addressed direct to the publisher. —EUGENE A. RAU, *Bethlehem, Pa.*

The pasque flower.—This plant (*Anemone patens*, var. *Nuttalliana*) is stated in *Drugs and Medicines of N. America* to have so acrid a juice that the hands have been blistered in handling it, and the eyes temporarily closed by its irritating vapors. The writer hereof has passed most of his life where it grows abundantly, and is surprised to hear of its harmful nature. If crushed between the fingers it gives a nasal sensation and watering of the eyes similar to strong ammonia, and on this account is sometimes locally known as "hartshorn plant." To those who like the smell of ammonia it is rather agreeable than otherwise. —J. C. A.

American Forests.—Dr. J. T. Rothrock, of the University of Pennsylvania, recently delivered one of the course of University lectures in Association Hall, Philadelphia, taking for his subject "The relation of American Forestry to American Industry." Some of its salient features are brought out in the following synopsis from *The American:*

His University lecture was a summary of the latest development of the necessity of forestry laws to protect the future timber trade of the country. He showed the percentages of timber land to other productive territories, from the three per cent. of Great Britain to the forty-five per cent. of Sweden, and that the lowest ratio that can be called self-sustaining is fifteen per cent., while we have only a margin of one and a half per cent. between dearth and supply. At the rate at which our forests are being destroyed, this small advantage will soon disappear, and then there will be a timber famine throughout the land. Great Britain, between 1872 and 1876, imported seventy-seven million dollars' worth of timber—about $2.60 for each individual—while the supply was only about $1.30 from native sources. In the United States, besides using about $19.90 per head, we exported six hundred million dollars' worth. How long this can last is a questton of time, and very little time, too. There ought to be as large a proportion of woodland to clear land for atmospheric purification as for timber supply. The rain-fall is not necessarily affected by clearing off the timber; but failing springs and falling rivers do result from it, for forests diminish evaporation over eighty per cent.

What is the practical remedy within reach? Professor Rothrock points to Germany, with its nine forest schools, their high standard, and their able teachers and growing classes of pupils. One man in this country, Professor Sargent, of Massachusetts, is the only person employed and paid by a State to look after our vast empire of timber. He has worked hard to secure active measures to protect the interest entrusted to him. An exemption of preserved forests from taxes would soon return the loss of revenue in the enhanced value of the timber. The reckless destruction of trees is the first thing to be cured. Even if Congress withdraws national timber land from sale, it will be only a palliative, and there are no trained men to which this enormous source of future wealth can be safely entrusted. Within five years, our best white pine will all be gone; within thirty-five or forty years, all the rest of our good timber will have been exhausted. Can there be any question about the necessity of such legislation, State and National, as shall protect the country from a timber famine?

Variation and Human Interference.—EDITORS BOT. GAZETTE:—I see that Mr. Meehan, in your March number, does not get the idea that I wish to convey concerning variation. It seems to me that when variation *of a nature favorable to man's wishes* is found in plants, and not especially beneficial to the plant, that such variation *suggests human interference* and points towards *a prehistoric cultivation.* That the persimmon occasionally bears seedless fruit is well known, and I append a list of seedless fruits, or of reputed seedless fruits, that I have found mention of in my readings, arranging my material alphabetically. For further particulars and references, I would refer to my articles on "Seedless Fruits," published in the Transactions of the Massachusetts Horticultural Society, Part I., 1880.

Apple:—Fewer seeds in improved varieties than in the wild apples of Thoreau. Second crop apples rarely contain seed; quite numerous records of seedless fruit.

Azarole (*Cratægus azaroleus.*):—The best varieties bear no or few seeded fruit. (Darwin, An. & Pl.)

Banana:—A seedless fruit.

Barberry:—Has a stoneless variety.

Breadfruit:—The cultivated varieties usually seedless; the wild fruit and the poorer varieties bearing seed.

Cherries:—The cultivated varieties in part seedless. Of five varieties examined in 1882, 140 pits had 62 abortive, and one variety 28 out of 30 abortive.

Chamærops stauracantha:—Has the character of producing sterile fruit, but mixed with fertile in the same panicle. The pulp of the fruit is of a peculiar delicate, spongy consistence, and of a pure white and shining on the outside. The fruit is oblong, about one inch in largest diameter. It has probably been brought under a certain amount of cultivation from very remote times. (H. Prestoe, Rept. Trinidad Bot. Gard. 1880, p. 39.)

Citron:—Gallesio mentions the Long orange, and the Chinese orange citrons as seedless, or nearly so.

Cucumbers:—Are frequently seedless, especially when grown under glass.

Cycads:—In Focke's work, Die Pflanzen Mischlinge, he states that female plants often produce apparently perfect cones in green-houses of Europe. yet their seeds contain no embryos.

Date:—Seedless varieties are named by a number of writers.

Diospyros Kaki:—Varieties often seedless, and Brandis mentions a cultivated variety of *D. melanoxylon*, Roxb. as without stones.

Fig:—This bears seedless fruit in one crop at least, and Brandis says many varieties attain maturity with sterile seed.

Grapes:—So far as I have examined, diminution of seed accompanies progressive improvement in the grape. Many varieties of *Vitis vinifera* are absolutely seedless; the cultivated varieties of the American *Vitis* bear fewer seed in general, and smaller seed, and more variable in number, than the wild species from which they have originated.

Guava:—This is frequently seedless.

Lemon:—Seedless varieties are mentioned by several writers.

Lime:—Seedless varieties mentioned by Gallesio.

Lucuma bifera, Mol. of Chile, bears fruit twice a year. The early set have no kernels, the autumn set have two kernels (Molina, Hist. of Chile, I, 129).

Mangosteen:—In its wild state contains four seed; in the cultivated, much larger fruit, rarely more than one seed (Burbridge).

Medlar:—A stoneless variety is advertised by a French nurseryman, and is mentioned by Loudon.

Mulberry:—Seedless varieties are mentioned in the Orient, where the fruit is appreciated.

Opuntia Davisii, Engelm.:—All the fruit seen on the route on the Upper Canadian, eastward and westward of Tucumcari hills, near the Llano Estacado, were sterile (Engelmann, Pac. R. R. Rept. IV, 49).

Orange:—Seedless varieties mentioned by numerous observers.

Otaheitie Apple (*Spondias dulcis.*):—Commonly has no seeds (Forster Obs. p. 179), and Firminger (Gard. in India, p. 234) says he is told that the seeds never germinate, and young plants are usually obtained by graftings on seedlings of other species.

Peach Palm (*Guiliema speciosa*):—Generally devoid of seed (Humboldt); in most instances the seed is abortive (Seemann); is extremely prolific, bearing two crops a year, sometimes more, and one season all seedless fruits are produced, and the other season only seeded fruits; the seedless fruits are highly appreciated (Prestoe); it nowhere grows wild, but has been cultivated by the Indians from time immemorial (Bates).

Pear:— Second crop pears are invariably seedless (R. Manning) and there is a seedless variety; many varieties have seed usually abortive.

Persimmon:—Seedless fruits and fruit with diminished seed reported by all with whom I have talked who have lived in the region of their best growth. See also T. Meehan's testimony in March BOTANICAL GAZETTE.

Pineapple:—A seedless fruit.

Pistacia:—At Cabul is on record as having one year perfect fruit, the next a seedless fruit.

Pomegranate:—Seedless varieties and those with diminished seed mentioned by writers, and cuttings from a seedless form distributed from the U. S. Patent Office in 1860.

Service (*Pyrus lanuginosa*, Die C.):—According to Loudon, the fruit, when it is produced, is generally without seeds.

Strawberry:—Mr. Saunders, Superintendent of the gardens of the U. S. Dept. of Agr. at Washington, on Feb. 16, 1880, mentioned to me a plat of seedless strawberries that he once had growing, and Thomas Knight also mentions growing seedless fruit (Phys. & Hort. Papers, p. 276).

Tomato:—The improved varieties contain fewer seed than do the unimproved, so far as I have observed, and a variety called "Seedless" is described by Burr as containing but few seeds.

This hasty summary from my notes—not originally collected for the purpose of an article of this tenor—would seem to justify the assertion that seedless fruits is an improvement brought about, in the majority of cases, by human agency, and, as I have shown in my essay on "Seedless Fruits," is usually accompanied by improvement in quality. It is therefore quite logical to assume that when we find a wild fruit, very variable, and varying in a direction more beneficial to man than to the plant, that this plant has obtained its variable property from a sometime human interference.

Has not the doctrine of evolution and causation a sufficient hold upon our thought to justify an attempt at interpreting the plant's story? This attempt to question the plant is what I am doing, and I earnestly beseech the favor of obtaining co-workers in this scheme.—E. LEWIS STURTEVANT, M. D., *Geneva, N. Y.*

Tribute to Dr. Engelmann.—The following preamble and resolutions, indicative of the appreciation of the high scientific and personal character of

the late Dr. George Engelmann, were unanimously adopted by the Botanical Section of the Academy of Natural Sciences of Philadelphia, April 14, 1884:

WHEREAS, The Botanical Section of the Academy of Natural Sciences of Philadelphia has heard with profound regret of the death of Dr. George Engelmann; therefore,

Resolved, We regard this as a calamity to botanical science, and to those who were in any way associated with him in its study; also,

Resolved, That in his life he furnished an example of industry in his profession, of devotion to science, of thoroughness in investigation, and of success in labor, which will always command our admiration and respect; and be it further

Resolved, That by his readiness to aid all who were seekers after the truths of nature, by the conscientious answers to the botanical questions referred to him, no less than by his goodness as a man, we believe he has attached many to the science in whose service he died.

Resolved, That as a mark of respect to the memory of the deceased, these resolutions be entered upon the minutes of the Section, a copy to be transmitted to his family, and also a copy of them be furnished to the *Bulletin of the Torrey Botanical Club* and to the BOTANICAL GAZETTE, with the request that they be published therein.

JOS. T. ROTHROCK.
THOMAS MEEHAN.
JOHN H. REDFIELD.

Collections from Porto Rico.—Herr P. Sintenis (known through his journey in the Orient), is to begin a botanical examination of Porto Rico during the coming summer, under direction of the undersigned. The specimens will be offered at 30 marks ($7.50) a century. The undersigned will receive the names of subscribers to this collection, but prefers that payments should *not* be made in advance. DR. T. URBAN, *Schöneberg bei Berlin, Germany.*

EDITORIAL NOTES.

IN DR. VASEY'S Schedule of N. Am. species of *Paspalum*, in the last GAZETTE, p. 55, No. 5 should read *P. vaginatum* instead of *P. variegatum*.

MR. DAVIS L. JAMES recently read before the Cincinnati Society of Natural History a memorial notice of Thomas W. Spurlock, a botanist of considerable local reptuation.

THE MARCH NUMBER of *Grevillea* is accompanied with pages 17 to 32 of the new edition of Cooke's Handbook of Fungi, carrying the genus *Agaricus* through to the eighty-seventh species.

IN THE APRIL *Am. Naturalist* Prof. Bessey gives an account, with figures, of the discovery of glands upon the pedicels of *Sporobolus heterolepis*, to which some minute insects had stuck fast. In fact the victims led to the discovery of the trap.

THE BULLETIN of the Natural History Society of New Brunswick, No. III, contains the report of the Botanical Committee, with additions to the New Brunswick Flora, edited by Mr. G. M. Hay. In the list we note *Montia fontana* and *Potamogeton obtusifolius*.